



OPERATING MANUAL

AC/DC CLAMP METER WITH WIRELESS DATA TRANSMISSION

CMP-600



Version 1.01

CMP-600 digital clamp meter is designed for AC/DC clamp measurements.

Moreover, the meter provides measurements of AC/DC voltage, frequency, resistance and diode testing.

The meter consists of 6-channel transmitter and receiver for remote read-out of measurement results from (maximum) six transmitters with one receiver. It is also possible to send data from one transmitter to multiple receivers simultaneously.

The most important features of CMP-600 include:

- auto-ranging measurement
- true RMS measurement,
- continuity measurement with a sound signal and diode test,
- **HOLD** - function enabling user to freeze the measurement result on the display,
- **MAX/MIN** - function for saving maximum and minimum measurement values (receiver only),
- **REL./SEL.** - function for resetting DC measurements and perform AC differential measurements,
- setting lower and upper limits and alarm in case of exceeding them (receiver only),
- real-time clock (receiver only),
- option for setting measurement parameters and readout of the results on a PC via USB (receiver only),
- safe, covered clamps.

CMP-600 meter is a modern, easy and safe measuring device. Please acquaint yourself with this manual in order to avoid measuring errors and prevent possible problems in operation of the meter.

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1 Safety

In order to provide conditions for correct operation and the correctness of the obtained results, the following recommendations must be observed:

- before using the meter read carefully this manual,
- the meter should be operated only by qualified persons that have passed health and safety training,
- any application that differs from those specified in the present manual may result in a damage to the device and constitute a source of danger for the user.
- during measurements the operator must not have a direct contact with exposed accessible parts of grounding (e.g., exposed metal pipes of the heating system, grounding wires, etc.); moreover the operator must ensure good insulation conditions by wearing proper clothing to working, gloves, footwear, insulating mats, etc.
- do not touch exposed, conductive parts if the measured circuit is live,
- during measurement with the test leads, always keep your hands away from the protective ring of the test leads,
- during measurement with the clamps, always keep your hands away from the protective ring of the meter,
- pay particular attention during measurements of voltages exceeding 60VDC or 30VAC RMS as they are potentially danger and may result in electric shock,
- while checking the presence of voltage, make sure that this function works correctly (by measuring known voltage) before assuming that zero readout indicates no voltage,
- It is unacceptable to operate the following:
 - ⇒ a damaged meter which is completely or partially out of order,
 - ⇒ a meter with damaged insulation of test leads ,
 - ⇒ a meter stored for an excessive period of time in disadvantageous conditions (e.g. excessive humidity).
- before measurement, make sure that test leads are connected properly and the rotary switch is set correctly,
- before switching between functions disconnect test leads from the tested object,
- before measurement, make sure that the current values of the tested object do not exceed the maximum measuring range of the meter,
- do not open the meter during the measurement,
- before measuring the resistance, turn off power from the tested circuit,
- do not use the meter in damp environment, with wet hands or during the rain
- before current measurements remove test leads from input terminals,
- place tested wire/conductor between clamps (centrally) in order to ensure the accuracy of the measurement,
- current measurement should be conducted away from the strong current environments in order to ensure the accuracy of the measurements,
- do not use the meter near the devices that emit noise or in an environment with sudden temperature changes, as such conditions may result in unstable or improper read-out,
- transmission distance between transmitter and receiver may be up to 100 meters in open space, however it may decrease, depending on building materials and construction of the building,
- do not use the unit in environments with high interference, as they may prevent the transmission,
- do not place the transmitter inside devices or in locations with metal enclosures during data transmission - as it may prevent the transmission,
- signal transmission may be weak or delayed while operating in high or low temperatures,
- if the measurement results are displayed in unstable, inconsistent manner and when  symbol appears, immediately replace the batteries to ensure proper operation of the meter,
- do not expose the meter to direct sunlight, extreme temperatures and moisture,
- repairs may be carried out only by an authorised service point.

WARNING:

Do not conduct measurements in explosive atmosphere (e.g. in the presence of flammable gases, vapours, dusts, etc.). Using the meter in such conditions may result in sparking and cause an explosion.

WARNING:

Do not conduct measurements on a circuit where the voltage exceeds 600V AC with regard to the ground. Do not conduct measurements of voltages exceeding 600V AC/DC. The potential of the COM input port with regard to the ground must not exceed 600V AC/DC.

NOTE!

The meter is protected against overload:

- for current measurements: up to 660A AC/DC
- for other measurements: up to 600V AC/DC

2 Preparing the meter for operation

After purchasing the meter, check whether the content of the package is complete.

Before performing the measurement:

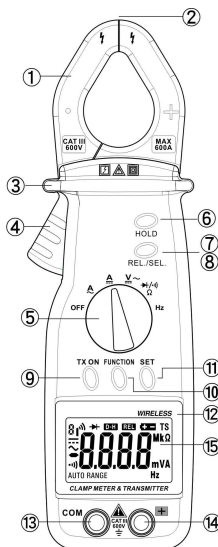
- make sure that the battery level is sufficient for measurements,
- check whether the meter casing and insulation of the test leads are not damaged,
- to ensure consistent measurement results it is recommended to connect black lead to **COM** terminal and red lead to **+** terminal.

WARNING:

Connecting wrong or damaged leads may cause electric shock (dangerous voltage)

3 Functional description of CMP-600T

3.1 Measuring terminals and components of the measuring function selection



① **Clamps**

② **Clamp contact point**

③ **Protective ring (protection barrier)**

④ **Lever for clamp opening**

⑤ **Rotary switch**

Function selection:

- **OFF** – meter switched off
- **A** – AC measurement
- **A** – DC measurement
- **V~** – AC/DC voltage measurement
- **Ω/▶/•••** – resistance measurement, diode check, continuity test
- **Hz** – frequency measurement

⑥ **HOLD button**

Freezing the measurement results on the display.

⑦ ⑧ **Rel./Sel. button**

- for **A** - relative measurement
- for **A** setting "0"
- for **V~** selecting between AC/DC
- for **Ω/▶/•••** selecting between resistance measurement / diode test / circuit continuity test

⑨ **TX ON button**

Turning the wireless transmission ON.

⑩ **FUNCTION button**

Transmission configuration.

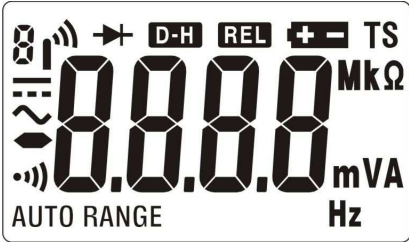
⑪ **SET button**

Setting the transmission parameters.

⑫ **Nameplate**

- ⑬ **COM input port**
Measurement input for all measurement functions except current measurement (connected to the ground of the meter).
- ⑭ **Input port** 
Measurement input for AC/DC DC voltages, frequency, resistance and diodes.
- ⑮ **Liquid Crystal Display (LCD)**

3.2 Liquid Crystal Display (LCD)



Symbols and units	Description
	Setting ID code for transmission (channel no. from 1 to 6).
	Transmission mode ON.
TS	The choice of transmission time: 2, 10, 30, 60 or 120 seconds.
	DC measurement.
	AC measurement.
	Negative polarity.
AUTO RANGE	Auto-ranging
	Circuit continuity test.
	Diode test.
D-H	HOLD mode (result by) enabled.
REL	Measurement in relative mode or setting the "zero" point.
	Low battery level.
Hz	Frequency measurement unit
MΩ, kΩ, Ω	Resistance measurement unit.
mV, V	Voltage measurement unit.
A	Current measurement unit.
0.000	Displaying measurement results.

3.3 Leads

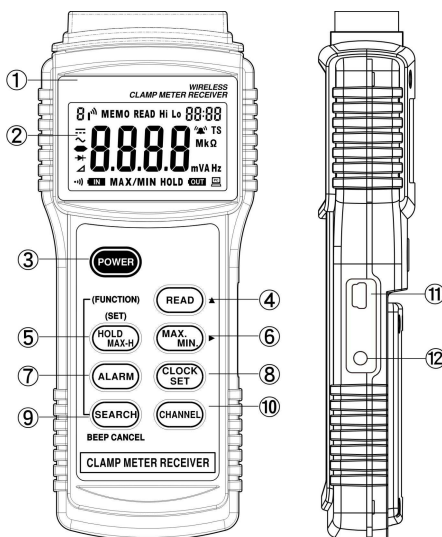
The manufacturer guarantees the correctness of read-outs only when original test leads are used.

WARNING:

Connecting wrong or damaged leads may cause electric shock (dangerous voltage) or improper measurement.

4 Functional description of CMP-600R

4.1 Components of the measuring function selection



① **Nameplate**

② **Liquid Crystal Display (LCD)**

③ **POWER button**

Switching power ON/OFF (after 3 s).

④ **READ button**

Readout of saved maximum and minimum values.

Additional function (▲): changing digits while setting the clock and limit values.

⑤ **HOLD/MAX-H function**

Freezing the measurement results on the display/ freezing maximum result.

Additional function (SET): to work with **FUNCTION** button to set the transmission time and to work with **CHANNEL** button, to set ID code that enables switching on/off the transmission function.

⑥ **MAX./MIN button.**

Saving maximum or minimum measurement result.

Additional function (▲): switching to other digits while setting the clock and limit values.

⑦ **ALARM button**

Setting the limit (activating the measurement with a limit).

⑧ **CLOCK SET button**

Setting the clock.

⑨ **SEARCH button**

Manual search for the signal.

Additional function (**BEEP CANCEL**): deactivates the alarm.

Additional function (**FUNCTION**): setting the transmission time.

⑩ **CHANNEL button**

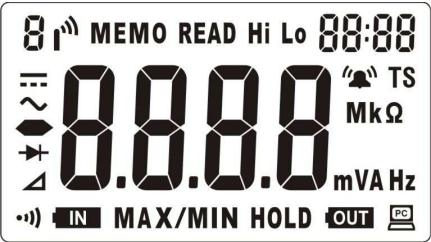
Switching channels.

⑪ **USB port (in devices with USB function)**

⑫ **PWR terminal** ⊕ ⊖ —

External DC power supply 3V/10mA.

4.2 Liquid Crystal Display (LCD)



Symbols and units	Description
8	Setting ID code for transmission (channel no. from 1 to 6).
	The symbol flashes when receiving a signal from the transmitter.
MEMO	Saved maximum and minimum values.
READ	Readout of saved maximum and minimum values.
Hi Lo	In alarm mode when the result is < or > from preset limits.
88:88	Auxiliary field: clock in 24-hour mode.
	DC measurement.
	AC measurement.
	Negative polarity.
	Diode test.
	Relative mode of the measurement.
	Circuit continuity test.
8.8.8.8	Main field: measurement result.
IN	Low battery level of receiver.
OUT	Low battery level of transmitter.
MAX/MIN	Readout of saved maximum and minimum values.
HOLD	HOLD mode enabled - measurement result frozen on the display.
	PC connection (this symbol appears when the meter has USB function).
	Alarm mode: the symbol flashes and alarm is activated when the measurement result reaches the pre-set limit value.
TS	Transmission time: 2, 10, 30, 60, 120 s
-no-	No signal from the transmitter.
Hz	Frequency measurement unit
MΩ,kΩ,Ω	Resistance measurement unit.
mV,V	Voltage measurement unit.
A	Current measurement unit.

5 Measurements

The content of this chapter should be thoroughly read and understood since it describes methods of measurements and basic principles of interpreting measurement results.

5.1 Current measurement

WARNING:

Do not conduct measurements on a circuit where the voltage exceeds 600V AC/DC. Do not conduct measurements on circuits with unknown potential.

WARNING:

Do not start the measurement when the battery compartment is open.

WARNING:

Do not start the measurement with test leads connected to the meter.

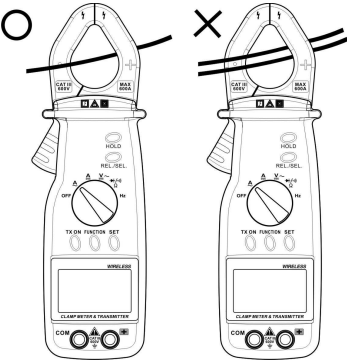
Note:

During current measurements, make sure that the meter clamps are fully tightened. Otherwise, the meter will not be able to make accurate measurements. The most accurate measurements are available when tested wire/conductor is placed centrally between meter clamps.

5.1.1 AC measurement

To perform AC measurement:

- Set the rotary switch at $\bar{A}$,
- open clamps of the meter and close them around a single wire (figure below),
- read the measurement result on the display,
- after completing the measurement turn off the meter.



5.1.2 DC measurement

To perform DC measurement:

- Set the rotary switch at $\bar{A}$,
- press **REL** button to set 'zero' (auto-ranging will be disabled and the measurement range will be set after pressing **REL**),
- open clamps of the meter and close them around a single wire,
- after readouts stabilize - read the measurement result on the display,
- after completing the measurement turn off the meter.

Notes:

- If the minor readouts before the measurement are not taken into account, it is not necessary to press **REL** button in order to set the "zero" point - then the measurement will be conducted in auto-ranging mode.
- When symbol  appears, it means that the measured current direction is opposite to the polarization indicated on the clamp.

5.2 DC voltage measurement

WARNING:

Do not conduct measurements on a circuit where the voltage exceeds 600V AC with regard to the ground. Do not conduct measurements of voltages exceeding 600V AC/DC. The potential of the COM input port with regard to the ground must not exceed 600V AC/DC.

WARNING:

Do not start the measurement when the battery compartment is open.

To perform DC voltage measurement:

- Set the rotary switch at $\text{V}\text{---}\sim$,
- connect red test lead to  terminal, and black test lead to **COM** terminal,
- contact the blades of test probes to the points of measurement; in DC measurements red probe should be applied to the point of higher potential,
- read the measurement result on the display,
- after completing the measurements remove test leads from the terminals and turn off the meter.

Notes:

- When symbol  appears, it means that the polarization of the object is opposite to the polarization of the meter.

5.3 Measurement of alternating voltage

WARNING:

Do not conduct measurements on a circuit where the voltage exceeds 600V AC with regard to the ground. Do not conduct measurements of voltages exceeding 600V AC/DC. The potential of the COM input port with regard to the ground must not exceed 600V AC/DC.

WARNING:

Do not start the measurement when the battery compartment is open.

To perform AC voltage measurement:

- Set the rotary switch at $\text{V}\text{---}\sim$,
- press **REL/SEL.** button and the following symbol will be displayed: $\sim$,
- connect red test lead to  terminal, and black test lead to **COM** terminal,
- contact the blades of test probes to the points of measurement,
- read the measurement result on the display,
- after completing the measurements remove test leads from the terminals and turn off the meter.

5.4 Measurement of resistance

WARNING:

Do not conduct measurements on the circuit under the voltage.

WARNING:

Do not start the measurement when the battery compartment is open.

To perform the resistance measurement:

- Set the rotary switch at $\Omega/\rightarrow/\bullet/\bullet/\bullet$,
- connect red test lead to $\oplus$ terminal , and black test lead to **COM** terminal ,
- contact the blades of test probes to the points of measurement,
- read the measurement result on the display,
- after completing the measurements remove test leads from the terminals and turn off the meter.

Notes:

- Do not touch the metal probe with your hand to avoid measurement errors.

5.5 Diode test

WARNING:

Do not conduct measurements on the circuit under the voltage.

WARNING:

Do not start the measurement when the battery compartment is open.

To perform the diode test:

- Set the rotary switch at $\Omega/\rightarrow/\bullet/\bullet/\bullet$,
- press **REL./SEL.** button and the following symbol will be displayed: $\rightarrow/\bullet/\bullet/\bullet$,
- connect red test lead to $\oplus$ terminal , and black test lead to **COM** terminal ,
- contact the blades of test probes to the diode: red test lead should contact the anode and the black should contact cathode,
- read the measurement result on the display: forward voltage of the diode is displayed, which for a typical silicon diode is approx. 0.7 V and for germanium diodes is approx. 0.3 V; when the diode is polarized in backward direction or the circuit is broken, the display will indicate **OL**; when the diode is shorted, then the display will indicate 0000 or other value,
- after completing the measurements remove test leads from the terminals and turn off the meter.

5.6 Circuit continuity test.

WARNING:

Do not conduct measurements on the circuit under the voltage.

WARNING:

Do not start the measurement when the battery compartment is open.

To perform the continuity test:

- Set the rotary switch at $\Omega/\rightarrow/\bullet/\bullet/\bullet$,
- press **REL./SEL.** button twice and the following symbol will be displayed $\bullet/\bullet/\bullet/\bullet/\bullet$,
- connect red test lead to $\oplus$ terminal , and black test lead to **COM** terminal ,
- contact the blades of test probes to the points of measurement,
- read the measurement result on the display; beep will be activated when resistance values are below approx. 100 Ω ,
- after completing the measurements remove test leads from the terminals and turn off the meter.

5.7 Frequency measurement

To perform frequency measurement:

- Set the rotary switch at **Hz**,
- connect red test lead to $\oplus$ terminal , and black test lead to **COM** terminal ,
- contact the blades of test probes to the points of measurement,
- read the measurement result on the display,
- after completing the measurements remove test leads from the terminals and turn off the meter.

6 Special features of the transmitter

6.1 HOLD function

By pressing **HOLD** button, you will freeze currently displayed measurement values and the display shows **D-H**. By pressing button again you will return to normal display of currently measured values.

This function is available only for current and voltage measurements.

6.2 Differential (relative) mode of measurement

In order to activate the differential mode of measurement press **REL./SEL.** button (the following symbol will be displayed **REL**). Then the result is displayed as the difference between the reference value and the current read-out (measured at the moment of pressing the button). For example: if the reference value is 20A and the current reading is 12.5A, then the display will show the result of -7.5 A. If the new reading is identical to the reference value, then the display will show zero. Pressing **REL./SEL.** button again will close the differential measurement mode.

This function works only for AC measurements, whereas for DC measurements it enables the user to set zero.

Notes:

- In the differential measurement mode, the measurement range is fixed, depending on the reference value (message **AUTO RANGE** disappears). To restore the autorange function, turn the meter OFF and back ON, when set on the desired function.
- The above remark also applies to DC measurements. In this case the reference value is "0".

6.3 Transmission mode

To activate the transmission mode press **TX ON** button and the following symbol  will be displayed. The transmission mode ends, when the button is pressed again and  symbol disappears. (In  mode, the display is refreshed approx. once per second.)

6.4 Transmission settings

To set the transmission time, press **FUNCTION** button for 2 s., the following symbol appears **TS**. Another short press of the button will switch to ID setting - which is the number of the transmission channel (1 .. 6). Setting the transmission time or ID is performed with **SET** button.

Pressing **FUNCTION** button for 2 s. will bring the meter back to the measurement mode.

Notes:

- When using one transmitter for sending data to one receiver, the transmission time of both devices must be the same to ensure correct data transfer. Also the ID code of the two devices must be the same.

7 Special features of the receiver

7.1 HOLD and MAX-HOLD functions

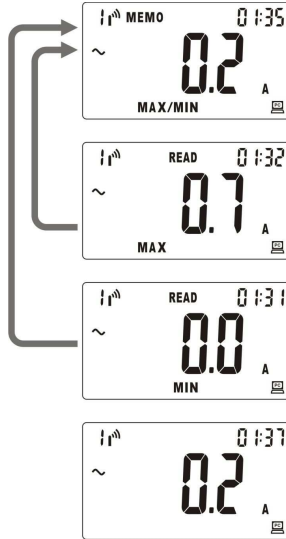
By pressing **HOLD/MAX-H** button, you will freeze currently displayed measurement values and the display shows **HOLD**. By pressing button again you will return to normal display of currently measured values.

By pressing **HOLD/MAX-H button for 2 s.** you will display maximum value of the measurement result on the display, which will show **MAX HOLD**. By shortly pressing button again you will return to normal display of currently measured values.

This function is available only for current and voltage measurements.

7.2 Saving and displaying the maximum and minimum value

The meter returns to MEMO MAX/MIN mode when for 10 s. **READ** button is not pressed.



Press **MAX/MIN** button to enter the mode of saving maximum and minimum values.

Press **READ** button to read the saved maximum value.

Press **READ** button to read the saved minimum value.

Press **MAX/MIN** button to cancel MAX/MIN mode and return to the measurement mode.

Notes:

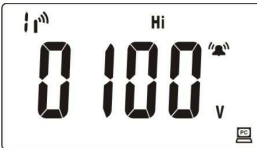
- After returning to the measurement mode saved max./min. value are stored in memory.
- Pressing **READ** button in the measurement mode will show stored values.

7.3 Measurement mode with alarm

The meter allows user to set the maximum value (upper limit) or minimum value (lower limit). When these values are exceeded the meter will beep (alarm) for 2 minutes. The beep may be deactivated by pressing **SEARCH/BEEP CANCEL**, button, providing that the current measurement result is between minimum and maximum value.

To enable the measurement mode with alarm, press **ALARM** button - the following symbol is displayed '🔔'. Pressing the button again will disable this function.

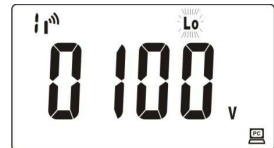
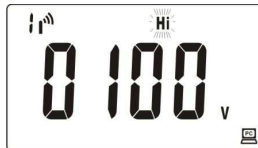
In order to set a limit press **ALARM** and then **SEARCH**.



Press **▶** button.

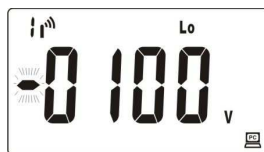
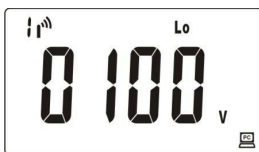
The meter is in limit setting mode.

Press **▲** button to select the upper (HI) or lower (LO) limit .



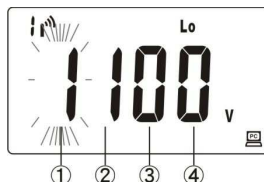
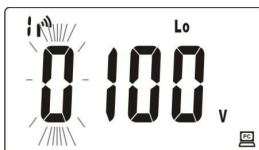
Press **▶** button.

Press ▲ button to select the symbol "+" or "-"



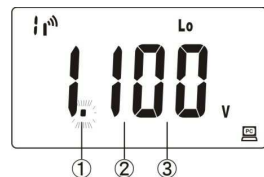
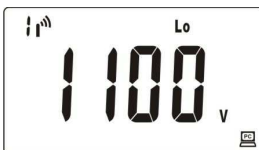
Press ► button.

Press ▲ to set the value of the first digit. Using ▲ and ► buttons set the values of remaining digits.



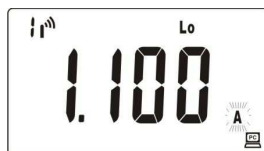
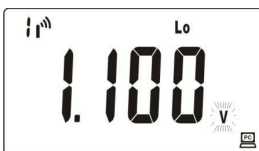
Press ► button.

Press ▲ button to move the position of the decimal point.



Press ► button.

Press ▲ button to choose a unit: V, mV or A.



Press **ALARM** button- setting the limit is completed. Automatic return to the measurement mode takes place after 10 sec. of meter inactivity on each stage

7.4 Reception Settings

To switch to activation of channels press **SEARCH (FUNCTION)** button for 2 sec. Another short press of the button will switch the meter to transmission time setting. Press **HOLD/MAX-H(SET)** button to activate ("ON") or deactivate ("OFF") individual channels, press **CHANNEL** to change channel number (ID). Transmission time is set with **HOLD/MAX-H(SET)** button

Pressing **SEARCH(FUNCTION)** button again for 2s. will bring the meter back to the measurement mode.

Notes:

- When using one transmitter for sending data to one receiver, the transmission time of both devices must be the same to ensure correct data transfer. Also the ID code of the two devices must be the same.

7.5 Setting the clock.

To set the clock, press **CLOCK SET** button and immediately press ► or ▲ (the meter after 2 s. automatically returns to the measurement mode). Use ► to switch between set digits and use ▲ to set their values.

The meter automatically returns to the measurement mode after 10 s. or after pressing **CLOCK SET** button.

7.6 Operation with multiple transmitters

When using multiple transmitters which transmit data to one receiver, power consumption is higher due to the continuous data transmission. When using one transmitter, set the remaining 5 ID codes to "OFF", in order to reduce power consumption.

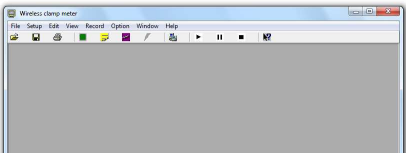
When using multiple transmitters which transmit data to one receiver, transmission time may be selected and set for each channel.

Notes:

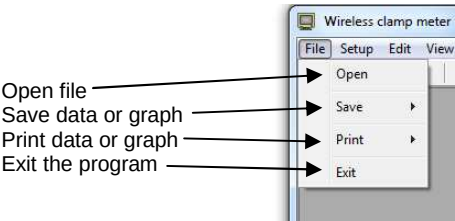
- In the measurement mode you can switch active ("on") channels with **CHANNEL** button.

7.7 Operation with PC

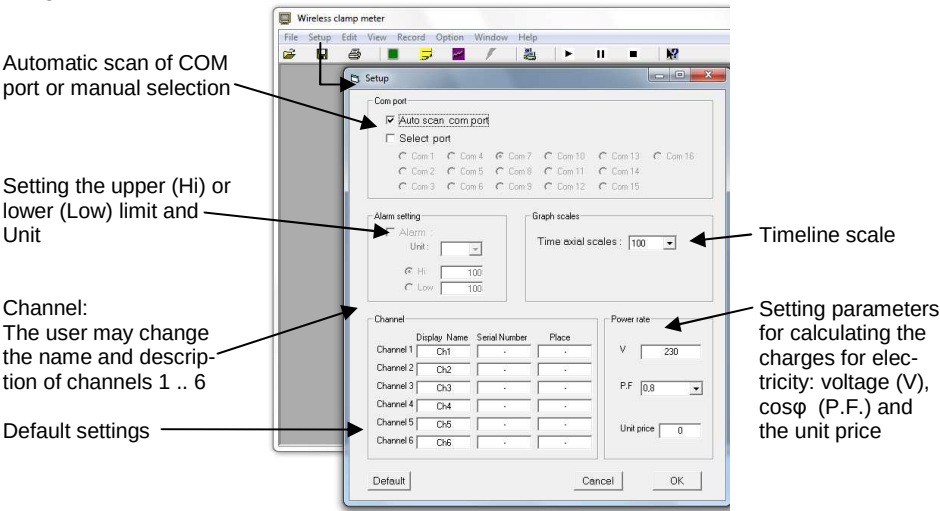
Install "Wireless clamp meter" software on your computer and USB driver included on the enclosed CD. The software works with Windows XP, Vista and 7. Connect CMP-600R receiver to PC via USB cable. After starting the program will show its main window, and the description of individual tabs and icons below:



File



Configuration

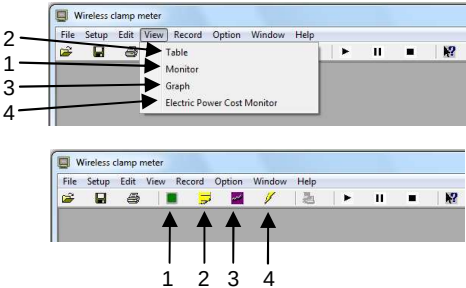


Edition



Clears the current data records and charts

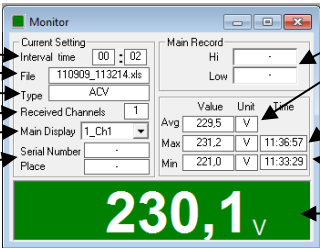
View



- 1 - Monitor: current data
- 2 - Table: data presented in a table
- 3 - Graph: data presented on a graph
- 4 - Estimated electricity costs

Screen

- Transmission time
- File Name
- Transmitted unit
- Number of receiving channels
- Displayed channel
- Channel description (serial number, location)

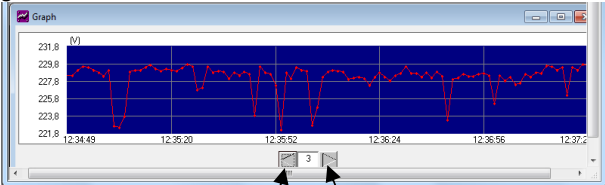


- Alarm limits
- Average value until present
- Maximum value until present
- Minimum value until present
- Present value

Table

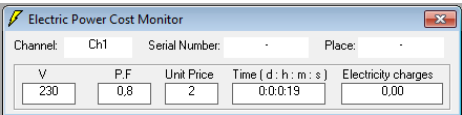
Index	Date	Time	Ch1	Unit	Time	Ch2	Unit	Time
1208	2011-09-09	13:14:35	223.9	V				
1209	2011-09-09	13:14:44	228.5	V				
1210	2011-09-09	13:14:54	228.3	V				
1211	2011-09-09	13:15:03	223.0	V				
1212	2011-09-09	13:15:13	228.3	V				
1213	2011-09-09	13:15:23	227.8	V				
1214	2011-09-09	13:15:32	228.9	V				
1215	2011-09-09	13:15:42	229.0	V				
1216	2011-09-09	13:15:51	229.5	V				
1217	2011-09-09	13:16:01	229.2	V				

Graph: current page



previous page next page

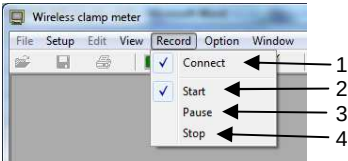
Estimated electricity costs



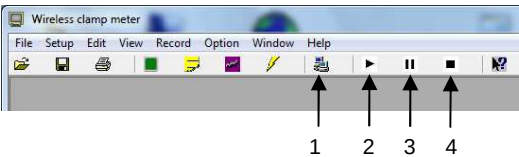
Notes:

- The above screen is not displayed when the transmission starts. Set the network nominal voltage, cosφ and the unit price of electricity in the Setup tab and select "Estimate Electricity Charge" in the View tab to begin calculations of electricity costs.

Records



- 1 - Connect: CMP-600 to PC
- 2 - Start: starts data collection
- 3 - Pause: pause in data collection
- 4 - Stop: end of data collection



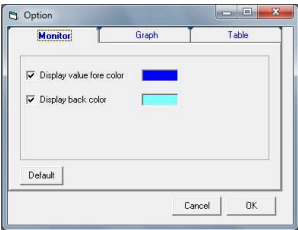
Notes:

- During the pause the file cannot be saved.

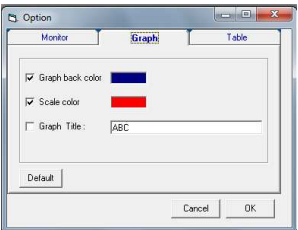
Option



Monitor



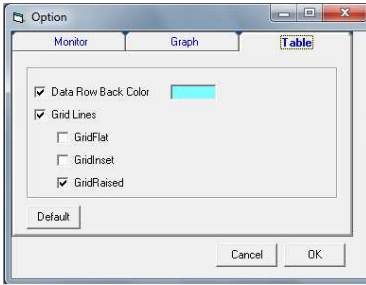
Graph



Selecting the background colour and font for displaying measured values on the screen.

Selecting the background colour, chart type and entering the name of the chart.

Table



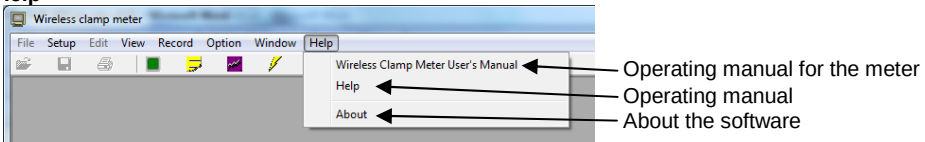
Selecting the background colour and type of grid in the table.

Window



Arranging windows

Help



8 Warnings and information displayed by the meter

Displayed symbol	Cause	Action
	Measuring range is exceeded.	Disconnect the test leads from the measured object
displayed by the transmitter	Battery discharged	Replace the battery
displayed by the receiver	Receiver battery discharged	Replace the battery
displayed by the receiver	Transmitter battery discharged	Replace the battery
HOLD	HOLD function enabled	
	Differential (relative) mode of measurement is enabled	

9 Replacing the battery

Both the transmitter and the receiver of CMP-600 are powered by two 1.5V AA batteries. We recommend using LR6 alkaline batteries .

WARNING:
If the test leads are left in the terminals during replacement of the batteries, there is a risk of electric shock with a dangerous voltage.

To replace the battery:

- 6. Remove the test leads from the measurement terminals of the transmitter, turn off the transmitter (receiver).
- 7. Remove the screw that secures the battery cover (the bottom of the compartment),
- 8. Remove the battery cover.
- 9. Remove discharged batteries and insert new observing proper polarity.
- 10. Replace the removed cover and tighten screws.

10 Cleaning and maintenance

The casing of the meter may be cleaned with a soft, damp cloth using all-purpose detergents. Do not use any solvents or cleaning agents which might scratch the casing (powders, pastes, etc.).

The electronic system of the meter does not require maintenance.

11 Storage

During the storage of the meter, the following recommendations must be observed:

- disconnect the leads from the transmitter,
- make sure that the transmitter, receiver and accessories are dry,
- when the meter is to be stored for prolonged period of time, batteries must be removed from the device.

12 Dismantling and Disposal

Used electrical and electronic equipment should be collected selectively, i.e. it must not be placed with another kinds of waste.

Used electronic equipment should be sent to a collection point in accordance with the Used Electrical and Electronic Equipment Act.

Before the equipment is sent to a collection point, do not dismantle any elements.

Observe the local regulations concerning disposal of packages, worn-out batteries and accumulators.

13 Annexes

13.1 Technical specifications

- "d.v." used in the specification of measurement uncertainty means "displayed value"

True RMS measurement for AC (50...500Hz)

Display range	Resolution	Measurement uncertainty (basic)
400A	0.1A	$\pm (1.8\% \text{ d.v.} + 10 \text{ digits})$
600A	1A	$\pm (1\% \text{ d.v.} + 5 \text{ digits})$

DC measurement

Display range	Resolution	Measurement uncertainty (basic)
400A	0.1A	$\pm (1.8\% \text{ d.v.} + 10 \text{ digits})$
600A	1A	$\pm (1\% \text{ d.v.} + 5 \text{ digits})$

True RMS voltage measurement for AC (50...500Hz)

Display range	Resolution	Measurement uncertainty (basic)	Input Impedance
4V	0.001V	± (1.5% d.v. + 10 digits)	11MΩ
40V	0.01V		10MΩ
400V	0.1V	± (1.5% d.v. + 5 digits)	
600V	1V		

DC voltage measurement

Display range	Resolution	Measurement uncertainty (basic)	Input Impedance
400mV	0.1mV	$\pm (0.75\% \text{ d.v.} + 3 \text{ digits})$	$\geq 100\text{M}\Omega$
4V	0.001V	$\pm (1\% \text{ d.v.} + 3 \text{ digits})$	11M Ω
40V	0.01V		10M Ω
400V	0.1V		
600V	1V		

Measurement of resistance

Display range	Resolution	Measurement uncertainty (basic)
400 Ω	0.1 Ω	$\pm (1\% \text{ d.v.} + 5 \text{ digits})$
4k Ω	0.001k Ω	
40k Ω	0.01k Ω	
400k Ω	0.1k Ω	
4M Ω	0.001M Ω	$\pm (3\% \text{ d.v.} + 5 \text{ digits})$
40M Ω	0.01M Ω	$\pm (5\% \text{ d.v.} + 5 \text{ digits})$

- opening voltage -approx. 0.4 V

Continuity test

Display range	Resolution	Measurement uncertainty (basic)
400 Ω	0.1 Ω	Not specified

- beep for resistance values below approx. 100 Ω

Diode test

Display range	Resolution	Measurement uncertainty (basic)
1.000V	0.001V	$\pm (10\% \text{ d.v.} + 5 \text{ digits})$

- opening voltage: approx. 1.5 V

Frequency measurement

Range	Resolution	Measurement uncertainty (basic)
5.000Hz	0.001Hz	± (0.7% d.v. + 5 digits)
50.00Hz	0.01Hz	
500.0Hz	0.1Hz	
5.000kHz	0.001kHz	
50.00kHz	0.01kHz	
100.0kHz	0.1kHz	

- Uncertainty for the sinusoidal signal
- Sensitivity: 5V rms for f = 5Hz...100kHz

NOTE: Presented values of uncertainty are increased by an additional value of 0.1 x specified uncertainty for each 1°C change when the ambient temperature is below 18°C or above 28°C.

Other technical specifications

- a) measurement category according to PN-EN 61010-1:2004 III 600V
- b) protection class of enclosure acc. to PN-EN 60529 IP40
- c) power supply for transmitter and receiver two LR6 batteries 1,5V
- d) time of continuous operation 300h without transmission, 100h with transmission (t=2s)
- e) maximum cable diameter Ø30mm or rail 35x10mm
- f) transmitter dimensions 220 x 64 x 35 mm
- g) receiver dimensions 179 x 72 x 32 mm
- h) weight of the transmitter without batteries approx. 251g
- i) weight of the receiver without batteries approx. 177g
- j) reference temperature +23 ± 2°C, rel. humidity < 80%
- k) operating temperature -10..+50°C, rel. humidity < 80%
- l) storage temperature -20..+60°C, rel. humidity < 70%
- m) sampling frequency 3x/s without data transmission and 1x/s with data transmission
- n) transmission frequency 433.62MHz
- o) polarization automatic, indicating negative polarization (-)
- p) display LCD, 4 digits
- q) compliance with the requirements of the standards EN 61010-1:2004, EN 61010-2-032
- r) quality standard ISO 9001

13.2 Standard equipment

Standard set of equipment supplied by the manufacturer includes:

- CMP-600 meter – **WMPLCMP600**
- test leads (2 pcs) – **WAPRZCMP1**
- AA batteries 1.5V (4 pieces)
- a case for the meter and accessories
- CD
- Operating manual

13.3 Optional accessories

- calibration certificate– **LSWLCPMP600**

13.4 Service

The provider of warranty and post-warranty services is:

SONEL S.A.
ul. Wokulskiego 11
58-100 Świdnica
Poland
tel. +48 74 858 38 60
fax +48 74 858 38 09
E-mail: export@sonel.pl
Web page: www.sonel.pl

Note:

Service repairs must be performed solely by SONEL S.A.

13.5 Laboratory services

Measurement Laboratory of SONEL SA offers tests and certification of the following instruments in the scope of their electrical/non-electrical features:

- infrared cameras,
- pyrometers,
- meters for conducting the following electrical protective measurements: insulation resistance, earth resistance and impedance, short-circuit loops, RCD parameters and multi-functional meters that perform the above functions,
- electrical safety meters,
- power quality analyzers,
- meters for measuring low resistance values,
- voltage meters, current meters (including clamp meters), resistance meters and multimeters,
- light meters.

A calibration certificate is a document confirming compliance of parameters declared by the manufacturer of tested device with national standards, specifying the measurement uncertainty

In accordance with **PN-ISO 10012-1, Annex A** – "Requirements for assuring quality of measurement equipment. The system for approving metrological measuring equipment" –SONEL S.A. recommends for its instruments to be periodically tested, observing -- **13-month intervals**.

Note:

In case of instruments used for tests related to the protection against electric shock, the person - performing measurements should have complete confidence in the efficiency of used apparatus. Measurements carried out with malfunctioning meter may cause wrong assessment of tested equipment in terms of its protection features

The product was made in Taiwan at the order of SONEL S.A.